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HEADLINE SERIES

ANTARCTICA IN WORLD AFFAIRS, by Laurence M. Gould Page 3

We are so busy trying to settle controversies about disputed territories in well-mapped areas of the world and planning to explore outer space that we are apt to neglect international problems emerging in the Antarctic Continent, which explorers and scientists are still busy opening up. But in this continent, which is almost as large as Europe and the United States combined, yet has never been the home of man, a number of nations including the United States have important interests, and several have staked out claims. Dr. Gould, a leading Antarctic expert, tells us what is happening now and may happen tomorrow in the world's greatest desert.

TALKING IT OVER, A Discussion Guide Page 50

NUMBER 128

MARCH-APRIL 1958

The Author

DR. LAURENCE M. GOULD, president of Carleton College, Northfield, Minnesota, a distinguished geologist, has had personal acquaintance with the Antarctic as second-in-command and senior scientist on the first Byrd Antarctic Expedition. He is currently serving as a member of the United States National Committee for the International Geophysical Year and as chairman of the USNC Antarctic Committee and is director of the U.S.-IGY Antarctic Program.

Coming Next

"Should U.S. Change Its China Policy?" by Eustace Seligman, member of the New York law firm of Sullivan and Cromwell and chairman of the board of directors of the Foreign Policy Association, and Dr. Richard L. Walker, chairman of the department of international studies at the University of South Carolina and author of *China Under Communism* (Yale University Press, 1955) . . . in the May-June issue of the *Headline Series* . . . present two different views regarding a highly controversial question.

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Antarctica in World Affairs

by Laurence M. Gould

FOR COMPLETE, UTTER, BUT MAGNIFICENT DESOLATION there is no scene on earth comparable to the ice mantle that smothers the Antarctic Continent. The desolation is no illusion. Here is a continent almost as large as Europe and the United States combined, which is almost completely lifeless. It is the world's greatest desert and it is the only continent that has never been the home of man.

Antarctica is the only polar continent; it is, moreover, the highest and coldest of all the continents. Its average altitude is more than a mile above sea level, and both its summers and winters are cold.

The desolation of Antarctica is further emphasized by the isolation of this continent, which stands all by itself unrelated to any of the other six continents. All the others are so closely tied together by isthmian links or land bridges or are separated by straits so narrow that one could start at Cape Horn and move in sequence to all of them without ever crossing more than 60 miles of shallow seas. Antarctica, by contrast, is everywhere surrounded by waters of oceanic depths, and even below Cape Horn, where it makes its longest stretch toward its nearest neighbor, South

America, there is still a barrier of more than 700 miles of oceanic waters.

The man in the street is apt to think of Antarctica and the Arctic in terms of their similarities, and yet they too are much better understood on the basis of their contrasts. The two really have little in common except that they are cold. Yet there is contrast even here; for the Antarctic is much colder and more inhospitable than the Arctic.

As the late Isaiah Bowman once said, the Arctic is a hollow and Antarctica, a hump. The Arctic is primarily an oceanic basin hemmed in by the continental masses of Eurasia and North America and the island masses of the North Atlantic. Antarctica is a kind of photostatic negative of the Arctic.

Antarctica presents a simplicity of outline which is furthermore distinctive. The great embayments of the Ross and Weddell seas break the almost circular outline of the continent into two major natural divisions. We call that part which lies almost wholly within the Western Hemisphere, West Antarctica, and that which lies largely in the Eastern Hemisphere, East Antarctica.

East Antarctica, which is bounded on the east by the great Antarctic horst in which fault block mountains rise to heights in excess of 15,000 feet, is twice as large as West Antarctica and is covered by an ice plateau that rises to heights in excess of 13,000 feet. In broad aspects, geologically, East Antarctica is a vast plateau similar to the great continental areas of Africa and Australia.

West Antarctica presents a sharp geographical and geological contrast to East Antarctica. Its topography is dominated by a series of folded mountains that appear in all areas studied to be continuations of the Andes of South America.

The Real Ice Age

"The land was so overwhelmed with ice that even at sea level the rock was all but entirely hidden. Here was an ice age in all earnestness." Thus did Sir Douglas Mawson describe his first

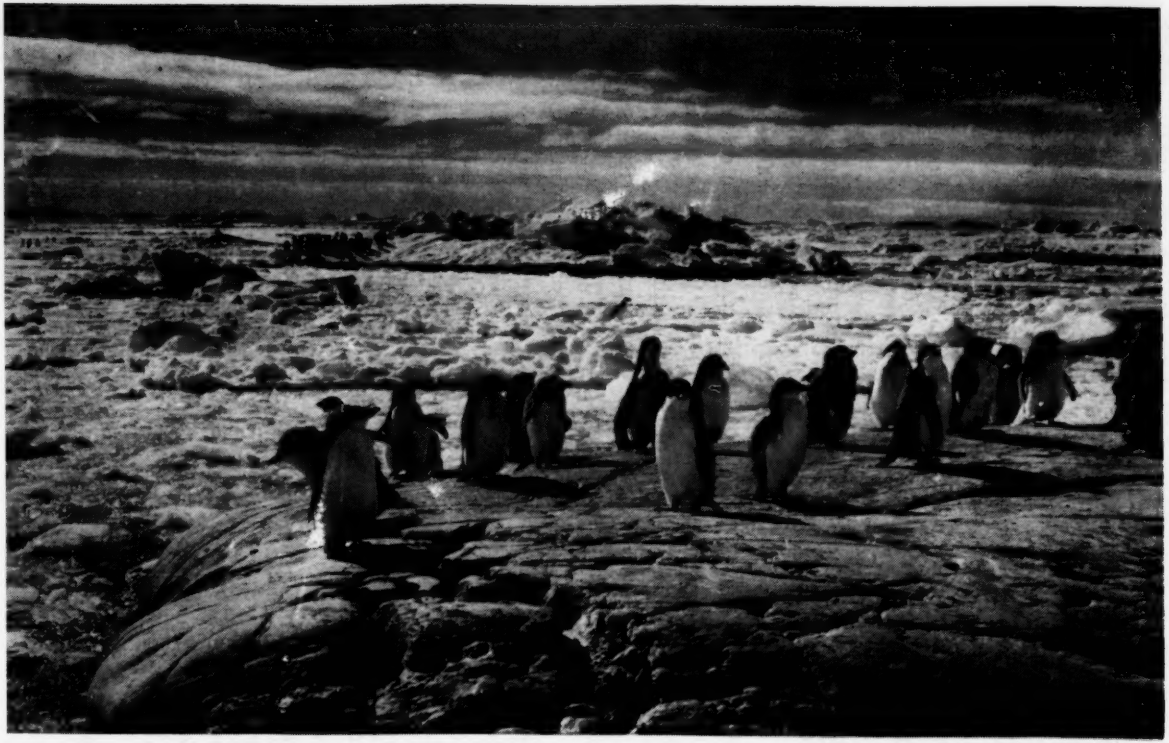
impressions of Antarctica in 1915. Indeed, the great continental ice sheet with its seaward extensions is still thousands of square miles larger than the continent which supports it. The total area is at least 5 million square miles. In protected areas indentations of the sea are covered with great monotonously flat areas of shelf ice. The most notable of these is the Ross Shelf Ice, which covers an area almost as large as the state of Texas at the head of the Ross Sea. Bare rock is to be seen only along rugged coast lines or rugged mountain slopes.

Various estimates of the thickness of the inland ice had been made before the beginning of the International Geophysical Year (IGY) observations. These appear now to have been conservative. A sounding at Byrd Station, which is about 5,000 feet above sea level, reveals a thickness of 10,000 feet of ice. In other words, the land which supports the ice is about 5,000 feet below sea level. This means that the weight of the accumulating ice over hundreds of thousands—perhaps more—of years has slowly depressed the crust of the earth. If the ice be 10,000 feet thick in West Antarctica at an altitude of 5,000 feet above sea level, one would speculate that it is much thicker on the great plateau of East Antarctica, which rises to heights in excess of 13,000 feet.

So far as is known the interior of East Antarctica is a featureless ice plateau. The underlying rock terrain is completely obscured. In West Antarctica, on the other hand, the icecap does not completely mask the underlying topographic features. Even in the heart of this region, mountain peaks rise at least 2,000 feet above the enveloping ice whose altitude nowhere probably reaches 10,000 feet. Since Antarctica lies almost wholly within the Antarctic Circle (66° 30′ S.), the continent is entirely in darkness at midwinter (about June 22) and entirely in sunlight at midsummer (about December 22).

Coldest on Earth

Antarctica has a land-ice climate. That is the severest climate



(Walter Sullivan for *The New York Times*)

PENGUINS—THE ONLY WELCOMING COMMITTEE IN WILKES LAND

on earth, with the coldest atmosphere both in summer and in winter. The average temperature for the warmest month as observed at stations even around the coast is always below zero. At Little America, from which the most extensive farthest-south readings are available, the highest average temperature for the warmest month was 24.4° F. (January 1931); the lowest monthly mean was –48.6° F. (August 1911). The mean annual temperature for all periods of observation was –12.6° F.

Preliminary records from our IGY station at the South Pole reveal the lowest temperature ever recorded, –102° F.

The severity of the Antarctic temperatures is accentuated by winds frequently of great violence and duration. The Australian explorer Mawson recorded an average wind velocity of 90 miles per hour for a whole day with an average of 40 for the whole year at his base on the continental margin below Australia. Although it is frequently windy in other known areas of Antarctica, no records elsewhere approach those of Mawson.

It is difficult to distinguish between new snow and drift, but all evidence indicates that Antarctica on the whole is a region of low precipitation. The annual amount at Little America was estimated to be about equal to six or seven inches of water.

Nothing Like An Antarctic Blizzard

The snow is usually fine and dry like sand; the supply is infinite; add the ingredient of high wind, and an Antarctic blizzard is the result. The snow stings like wind-driven sand, and for duration and intensity Antarctic storms are not duplicated anywhere else on earth. No words can describe to the uninitiated the experience of an Antarctic blizzard.

Antarctica is truly a desert. Both the plant and animal life can be described in two or three sentences. On some of the limited rock exposures there are lichens and mosses. Occasionally a few primitive arthropods and other primitive animal forms are found in moist places among the mosses in summer. The largest land animal known is a wingless mosquito.

PENGUINS—THE ONLY WELCOMING COMMITTEE IN WILKES LAND (Walter Sullivan for The New York Times)

The marine zone about the continent is as notable for its plenitude of life as the continent is for its dearth. Life forms range all the way from the floating microscopic plants and animals to the great blue or sulphur-bottom whale, which is the largest creature ever to inhabit the earth and is the basis for Antarctica's only commercial activity.

While gulls, petrels and fulmars spend much time there and are abundant, the most characteristic bird is the penguin, the emperor and Adélie species. The penguin and the skua gull, are the most prevalent of the indigenous Antarctic birds.

Dearth of Mineral Riches

There has been much speculation about potential mineral riches in Antarctica. Extravagant claims have been made, but on the basis of present knowledge one is not warranted in making any rigid assumption that there are mineral resources of commercial value anywhere on the continent. It must be pointed out, of course, that every other major continental land mass in the world does have or has had mineral deposits of great consequence, and so it may be that such deposits exist in Antarctica. At present not more than two-tenths of one percent of the continent has been explored in detail geologically.

There are vast deposits of coal. The discoveries which my companions and I made in the Queen Maud Range in 1928-30 so extended the dimensions of earlier discoveries that it is safe to say Antarctica probably has more coal than any other continent in the world and, indeed, may have as much as all of the rest put together. However, the coal is low-grade lignite and would not be commercially usable even if it were in more temperate latitudes. In the predictable future it must be thought of, not as a potential resource, but as a phenomenon of great geological interest because of the light it throws on the past climate and life of this now lifeless continent.

Traces of a variety of metallic minerals have been found, including such varied materials as manganese, copper, lead and

nickel, but in no case in such abundance as to indicate the presence of commercial deposits.

If one were going to Antarctica to prospect for minerals, the most likely place would be West Antarctica, beginning with the Palmer Peninsula and proceeding toward the interior of the continent. The Andean mountains are notable for their metallic mineral resources, and all present information leads to the conclusion that the geology, including the structure and age of the rocks in West Antarctica, duplicates that of the Andes in South America. Whether they are mineralized or not we do not know, and indeed only relatively small areas of the Andes mountains in South America have mineral deposits of consequence.

Last Continent of Adventure

When we consider our highly developed methods of communication and transportation, it is in some ways a source of wonder that such large areas of Antarctica remain to be explored. But when we consider the difficulties of access, this is not altogether surprising. Vast quantities of ice, as icebergs from the shelf ice and from glaciers, are discharged every year into the ocean surrounding Antarctica. Some of the larger bergs drift as far north as the 50th parallel before melting away. In addition to the icebergs the sea freezes over for several hundred miles around the continent each winter. During the brief Antarctic summer this ice is broken up by the winds and the tides and drifts northward as pack ice until it melts. Thus, between the "halo" of sea ice and the icebergs which surround it, Antarctica is isolated as no other continent. Add to that its remoteness, its inhospitable climate, its total lack of human habitation and its complete lack of any commercial resources, and we have the reasons why Antarctica is so little known and is still the last continent of adventure.

Why then has Antarctica suddenly become such a newsworthy subject? Primarily the answer lies in the fact that it is playing a dominant role in the International Geophysical Year. The IGY is man's most ambitious experiment in international cooperation

(Walter Sullivan for *The New York Times*)

Cargo ships *Greenville Victory* (foreground) and *Arneb* helplessly trapped by the compressed floes of the pack ice. The Navy's most powerful icebreaker, U.S.S. *Glacier,* cut them loose and they were able to proceed, one at a time, in her wake.

in science. It is the first attempt to study man's total environment. The largest empty segment of this environment has been Antarctica and the seas that surround it. Quite naturally, therefore, when this global program was envisioned great attention was directed toward Antarctica.

Southern Continent: Ancient Assumption

Even though our knowledge of Antarctica is sketchy, the existence of a southern continent was one of geography's ancient assumptions. Hipparchus and Ptolemy speculated about such a continent, but the earliest known map bearing the name "Terra Australis" appeared in 1531. Practically all areas south of the known world were presumed to be part of this hypothetical continent. Some misconceptions were eliminated by Vasco da Gama's voyage around the Cape of Good Hope and by Ferdinand Magellan's through the strait that bears his name, but geographers continued to regard Tierra del Fuego as a part of the southern continent until later voyages demonstrated its insularity. Even in the late 16th century the southern continent was believed to reach almost as far north as Java.

It was, of course, inevitable that every voyage south beyond the known world should reduce the size of this hypothetical land mass. When Abel Tasman discovered New Zealand in 1642, he thought it was part of the coast of "Terra Australis." But James Cook, on his first expedition, 1768-1771, sailed around both the north and the south islands and so took another big slice away from the unknown land. The illusion was finally dispelled by the brilliant achievements of this same James Cook, who in two major voyages from 1772 to 1775 circumnavigated the continent without actually sighting it. Indeed, when he withdrew from his Antarctic explorations, he left a doubt as to the existence of such a continent, observing with prophetic clarity that if there were such a land mass it would be so cold and inhospitable that it could not possibly be suitable for human habitation. The idea of a populated

southern continent as a source of trade, which had long been one of the motivating factors in the search for it, was therefore abandoned forever.

Early Exploration

The American Geographical Society presented, in *The Geographical Review* (Vol. XLVII, No. 1, 1957), a series of ten maps to illustrate the history of Antarctic exploration through 1955 (Figs. 1-10). Here, then, is a graphic representation of the dramatic story of Antarctic exploration as we start the final unrolling of the map in the International Geophysical Year, which began officially on July 1, 1957.

There are certain high points in the record revealed by this series of maps. The first, and I think the most notable of all time, was the voyages of James Cook. The next was the voyage of Admiral Fabian von Bellingshausen, who in 1819-1821 sailed farther south than Cook had gone and likewise circumnavigated the continent. Certainly on two occasions he came near the continental margin without apparently being aware of it. Karl Friedrich Gauss' work in terrestrial magnetism sparked one of the most remarkable periods of all, from 1838 to 1843. No fewer than ten ships took part in that expedition. Sir James Clark Ross, in 1841, opened the gateway that bears his name, and the Ross Sea has since been the chief route toward the interior of the continent.

Who Discovered Antarctica?

While we have no positive evidence that anyone actually set foot on the Antarctic Continent until the end of the 19th century (1898), there is no doubt that it was discovered much earlier.

Perhaps we shall never know who actually discovered the continent, for it was undoubtedly first sighted by sealers in the second decade of the 19th century, who were generally careful to guard the secrecy of their discoveries lest someone share in the exploitation of the abundant fur seals. The British believe the

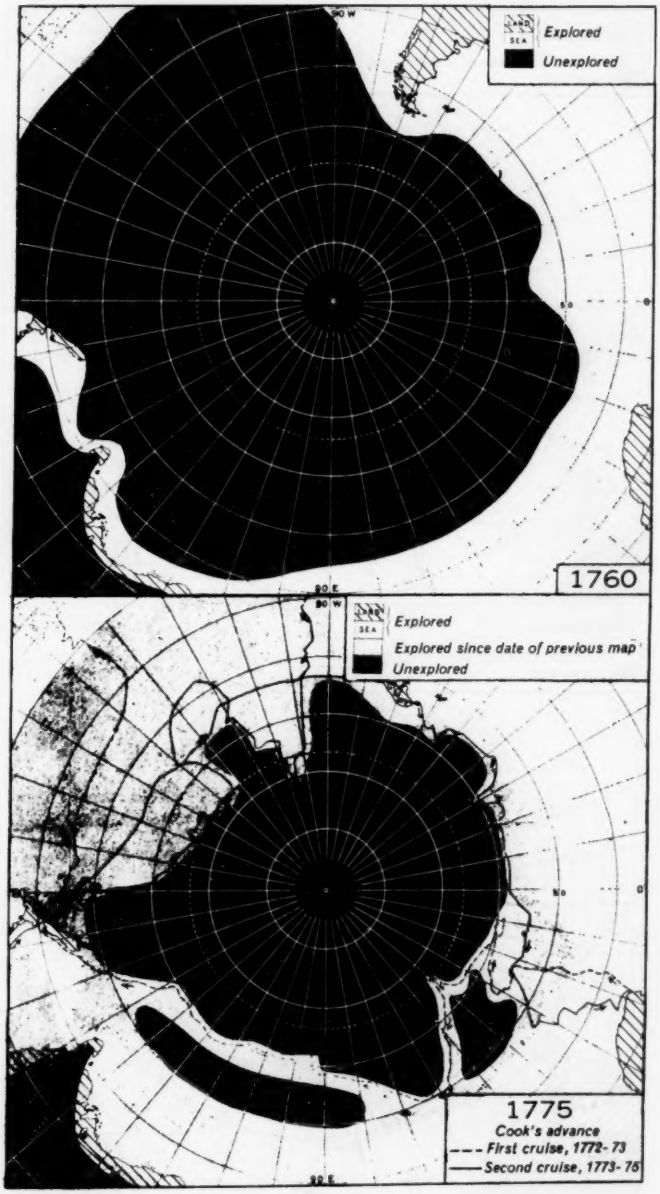

90 W
Explored
Unexplored
1760
90 E
90 W
Explored
Explored since date of previous map
Unexplored
1775
Cook's advance
First cruise, 1772-73
Second cruise, 1773-75
90 E

FIG. 1

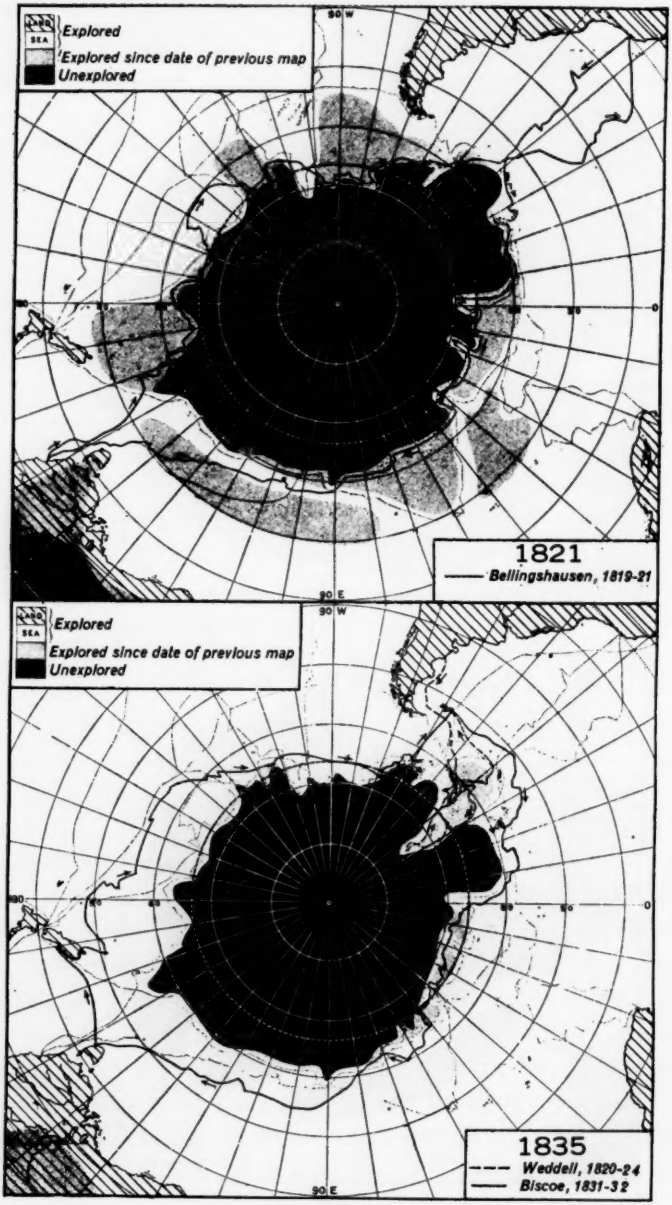

LAND
SEA
Explored
Explored since date of previous map
Unexplored
90 W
90 E
1821
Bellingshausen, 1819-21
LAND
SEA
Explored
Explored since date of previous map
Unexplored
90 W
90 E
1835
Weddell, 1820-24
Biscoe, 1831-32

FIG. 2

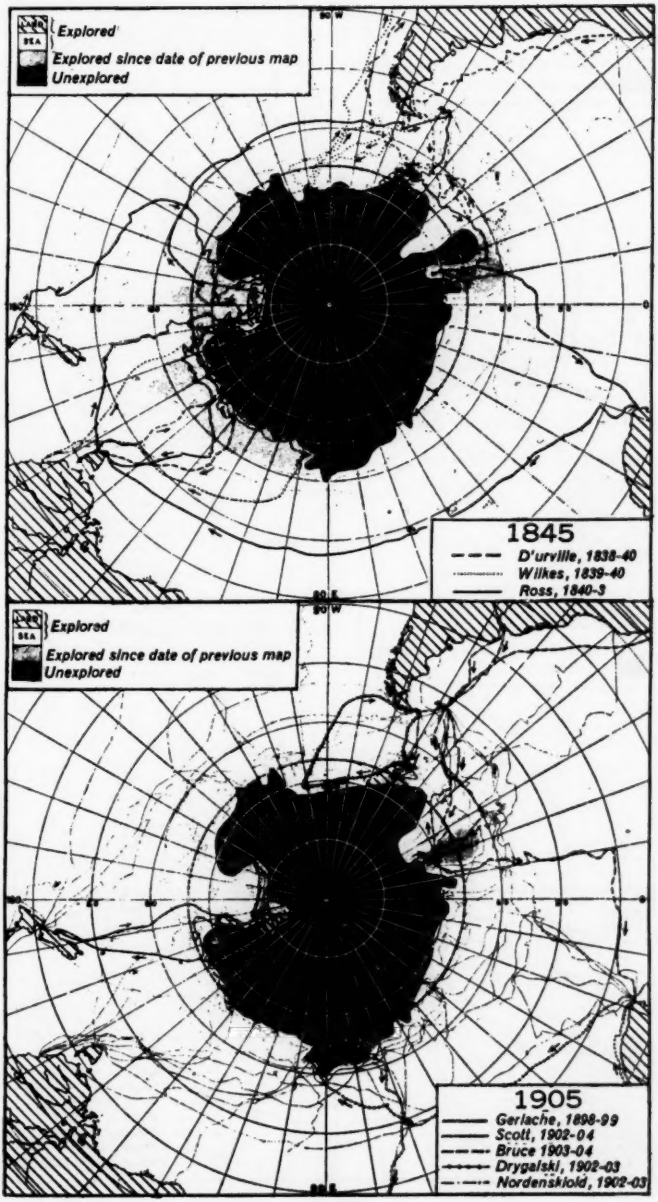

Explored
Explored since date of previous map
Unexplored
90 W
1845
D'urville, 1838-40
Wilkes, 1839-40
Ross, 1840-5
Explored
Explored since date of previous map
Unexplored
90 W
1905
Gerlache, 1898-99
Scott, 1902-04
Bruce 1903-04
Drygalski, 1902-03
Nordenskiold, 1902-03

FIG. 3

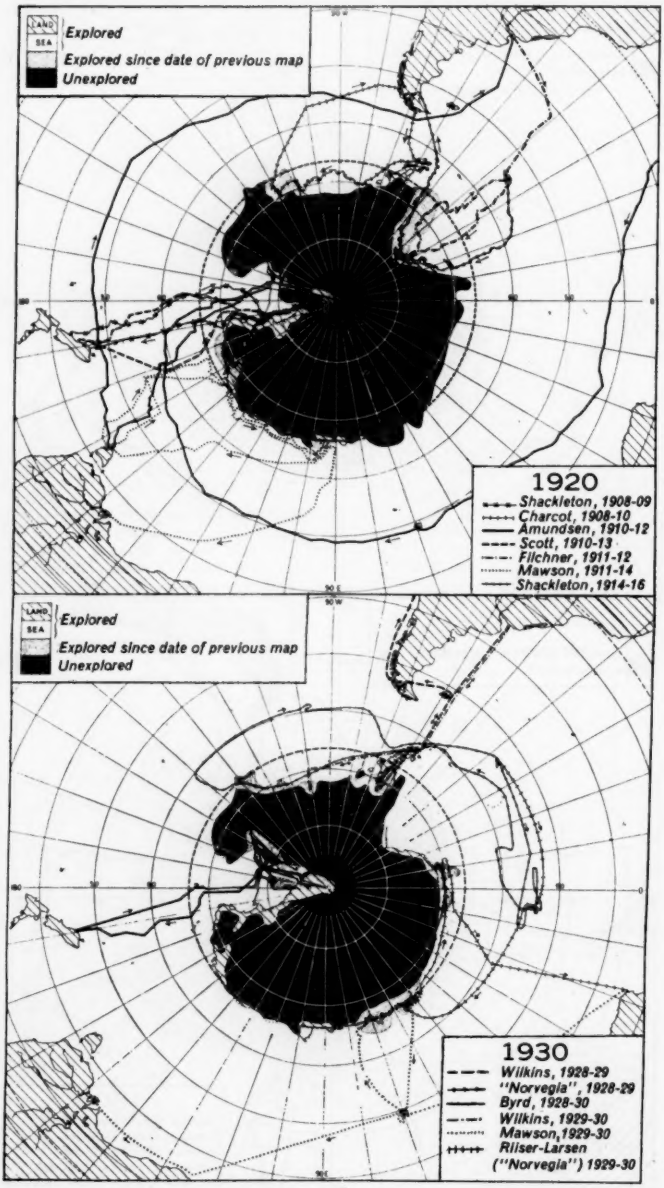

LAND
SEA
Explored
Explored since date of previous map
Unexplored
1920
Shackleton, 1908-09
Charcot, 1908-10
Amundsen, 1910-12
Scott, 1910-13
Filchner, 1911-12
Mawson, 1911-14
Shackleton, 1914-16
LAND
SEA
Explored
Explored since date of previous map
Unexplored
1930
Wilkins, 1928-29
"Norvegia", 1928-29
Byrd, 1928-30
Wilkins, 1929-30
Mawson, 1929-30
Riiser-Larsen ("Norvegia") 1929-30

FIG. 4

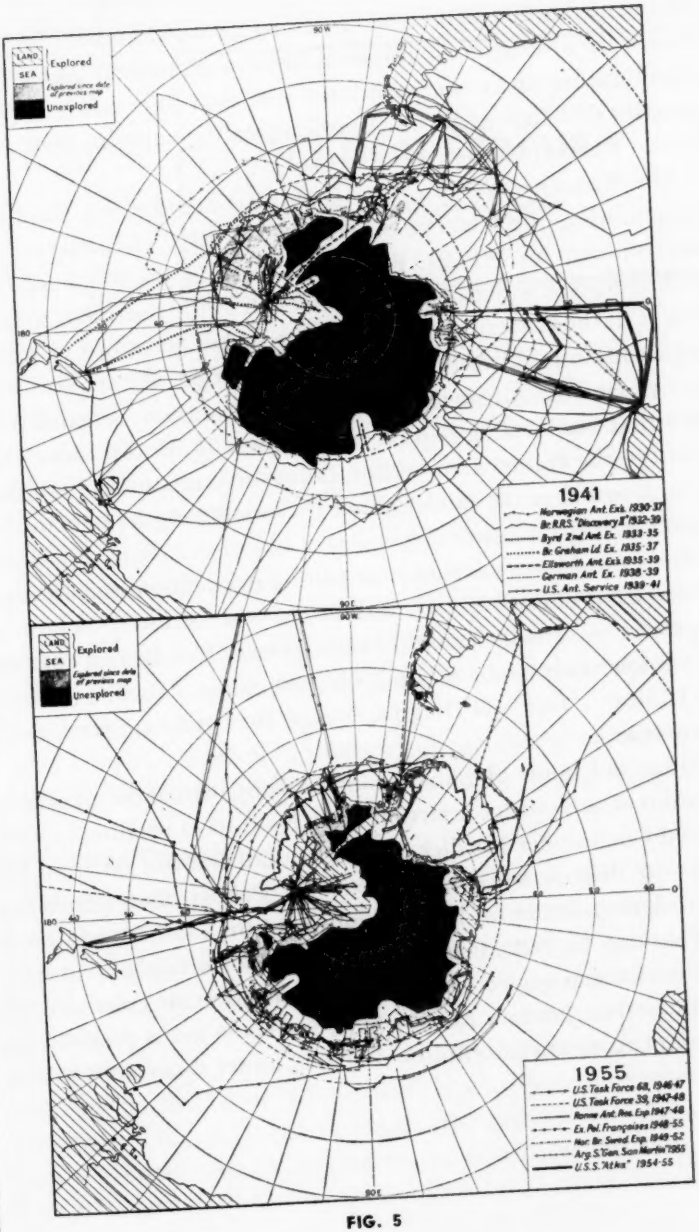

LAND
SEA
Explored
Explored since date of previous map
Unexplored
90 W
180
90
0
90 E
1941
Norwegian Ant. Exs. 1930-37
Br. R.R.S. "Discovery II" 1932-39
Byrd 2nd Ant. Ex. 1933-35
Br. Graham Ld. Ex. 1935-37
Ellsworth Ant. Exs. 1935-39
German Ant. Ex. 1938-39
U.S. Ant. Service 1939-41
1955
U.S. Task Force 68, 1946-47
U.S. Task Force 39, 1947-48
Ronne Ant. Res. Exp. 1947-48
Ex. Pol. Francaises 1948-55
Nor. Br. Swed. Exp. 1949-52
Arg. S. "Gen. San Martin" 1955
U.S.S. "Atka" 1954-55

FIG. 5

continent was first sighted by Captain Edward Bransfield in 1820. American investigators, however, believe Bransfield sighted an island rather than the mainland and that the continent was actually first sighted by an American sealing captain, Nathaniel Brown Palmer, in 1820.

The Russians have proposed a third contender, von Bellingshausen, who, in the service of Tsar Alexander I, circumnavigated the continent in 1819-21. From the record of his ship's log von Bellingshausen was probably near enough to the continent to have seen it in the African quadrant, yet he makes no record of seeing any such land. However, after an examination of the records of his voyage the All-Soviet Geographical Congress concluded in 1949 that von Bellingshausen had discovered the Antarctic continent in the Palmer Land sector. Other investigators believe they have shown that the land sighted by von Bellingshausen in this region is entirely insular.

All of these contenders have one thing in common: the assumed achievement of discovery of all three rests on the interpretation of imperfect records by modern investigators. The British call the area in question Graham Land, the Americans, Palmer Land and the Chileans, Tierra O'Higgins, though they make no pretense to discoveries.

So far as I know, the first person to sight the continent and to record it as such with conviction was a Nantucket whaling captain named Christopher Burdick, whose landfall was not far from the point in dispute by the supporters of Palmer and Bransfield. Burdick recorded in his log the sighting of the southern continent on February 15, 1821. Certainly, no future historians of Antarctic exploration can neglect this record which was made known to the public only in January 1952 by E. A. Stackpole in "A First Recognition of Antarctica," (Boston Public *Library Quarterly*, Vol. 4, No. 1).

Political Claims to Antarctica

THE GEOGRAPHIC LIMITS OF POLITICAL CLAIMS in both the Arctic and Antarctic regions are determined by the "sector principle," which was first proposed by the Hon. Paschal Poirier in the Canadian Senate on February 20, 1907, when he said in part:

"A country whose possession today goes up to the Arctic regions will have a right, or should have a right, or has a right to all the lands that are to be found in the waters between a line extending from its eastern extremity north and another line extending from the western extremity north. All the lands between the two lines up to the North Pole should belong and do belong to the country whose territory abuts up there."

The U.S.S.R. has invoked this principle in the Arctic, and it has been used by all the present claimant nations in Antarctica.

The "Sector Principle"

The sector principle is apparently derived from the "doctrine of continuity" used in past centuries to justify the extension of colonies into the hinterlands where actual physical control was not possible. It is a familiar principle in American history. It was the basis on which the American colonies and the early Atlantic seaboard states projected their claims hundreds of miles into the wilderness to the West. "Contiguity" is a further, more tenuous, extension of the principle of continuity and justifies claims to lands separated even by large areas of oceanic waters from the claimant state.

The application of the sector principle is obvious in the Arctic. It seems more artificial when applied to Antarctica. Theoretically, the basis for the boundary of any sector is the claimant's recorded exploration along the coast or mainland. In practice the parallel of 60° has been arbitrarily selected, probably because of the weak case most claimants could make for actual mainland discoveries. Moreover, sectors were generally announced in advance of exploration of any sort.

Britain, while accepting the 60th parallel for the most part, pushes its sector northward to the 50th parallel between longitudes 20° W. and 50° W. to include a number of islands.

Possession More Important Than Discovery

The ultimate justification of the seven Antarctic sectors claimed so far rests upon debatable evidence. Historically, claims to new lands have generally been based on the three factors of discovery, declaration or publication of claims and, finally, effective occupation.

Even in pre-19th century international law, possession was more important than prior discovery, and, as time passed, the requirements after discovery increased eventually to include the doctrine of effective occupation. But most students of international law agree that less precise standards should or do obtain in the polar regions than in more temperate lands.

The issuing of decrees, orders in council, or similar documents and even of postage stamps (often showing a map of the area in question) are presumed to substantially solidify a government's claims. The acceptance of mail by other nations implies recognition of the issuing authority.

The Hughes Doctrine

The importance of discovery rights in international law appears to have diminished generally over the years. Yet discovery has been advanced as the explicit basis for British claims to the Falkland Islands Dependencies and is certainly implied in the Australian, French and Norwegian claims. The position officially

maintained by our own State Department does not deny the validity of discovery rights, yet does not grant full claim to sovereignty on that basis. This position was first stated by Secretary of State Charles Evans Hughes in 1924, as follows: "It is the opinion of this department that the discovery of lands unknown to civilization, even when coupled with the formal taking of possession, does not support a valid claim of sovereignty unless the discovery is followed by actual settlement of the discovered country." Hughes' opinion further states that in polar regions, where "actual settlement would be an impossibility," discovery "would afford frail support" for political claims. This opinion is long since outmoded, for "actual settlement" is now possible almost any place on Antarctica man chooses. Yet our official position remains that of making no claims nor recognizing those made by other nations.

This policy of making no claims and recognizing none made by other nations has obvious faults, but has made us welcome wherever we have gone.

When representatives of participating nations met in Paris in July 1955 to decide on the locations of IGY stations, Argentine delegates protested the British plan to have their main IGY station near the head of Weddell Sea, where Argentina had already established its General Belgrano base. However, the Argentines were quickly mollified when they learned of United States plans to establish a base in this same general region, which is claimed by both Argentina and Britain. Similarly, Australia cordially welcomed the establishment of our Wilkes Station on the Knox Coast only 420 miles east of Russia's main base of Mirny.

Most Antarctic claims were made with little or no reference to effective occupation, and there is much difference of opinion as to just what the expression does mean. In attempting a general interpretation of "effective occupation" Richard Olney, United States Secretary of State in 1896, observed, "The only possession required is such as is reasonable under all the circumstances in view of the extent of the territory claimed, its nature, and the uses to which it is adapted and is put; while more constructive occu-

pation is kept within bounds by the doctrine of contiguity."

British claims are based in the first instance on the supposed discovery of the continent by Bransfield in 1820; but both Chile and Argentina explicitly and vigorously refuse to accept the circumstance of discovery as a factor in Antarctic claims. Perhaps they have a point in this case since there was a lapse of 88 years between the supposed discovery date and the date when claims were made.

Is Effective Occupation the Test?

In 1951 Argentina, in denying British discovery rights, asserted that effective occupation must be the test. Chile, even more vehemently denying British claims, stated that "in fact discovery and scientific expeditions carried out in the Antarctic do not and cannot constitute any title to this region."

But both Chile and Argentina harked back to even more tenuous rights than the 88-year-old discovery right of Britain. They based their claims originally on the assumption that when they won their independence from Spain, which by treaty granted them all the territory that had been considered part of the colony, this automatically extended their boundaries all the way to the South Pole. In 1539, when there was no knowledge of any southern continent, Spain laid claim to all lands extending as far as the South Pole, and for at least two centuries these claims were not disputed.

Now both Argentina and Chile rest their claims on effective occupation and contiguity. Argentina claims effective occupation on Laurie Island since 1904 through the operation of a weather station there. The basis for Chile's claims of effective occupation is the establishment of a whaling station on Deception Island in 1906.

The claims of both these countries to continuous and effective occupation are open to considerable question. Britain has solidified its position by the establishment of scientific and/or military stations. All other claimant nations have also followed

the lead of Argentina and Chile and established what they consider permanent stations.

Overlapping Claims

The position of the United States in the Antarctic is particularly complicated by the fact that Chilean and Argentine claims overlap each other 21°, and both, in turn, overlap the British in the Palmer Peninsula region. The concentration of stations in this area is a reflection of the multiplicity of claims rather than the desirability of having so many scientific stations so close together. Since effective occupation implies unilateral or exclusive control, the joint tenancy of certain spots such as Hope Bay in this area resolves nothing. The region is quiescent now, but shots were actually fired on February 2, 1952 at Hope Bay by the Argentine navy. The British, who were attempting a landing, were forced to withdraw temporarily. Consultations at higher levels restored order, and the British were allowed to land and establish, or re-establish, a meteorological station.

Technically, Antarctic political history began on July 21, 1908, when *Britain* claimed the Falklands sector. These first claims were modified by letters patent on March 28, 1917.

On July 30, 1923 the sovereignty of *New Zealand* was proclaimed over the Ross Dependency. This has been the region of much American activity beginning with the first Byrd Expedition in 1928. Little America, the Williams Air Operations Facility maintained by the Navy at McMurdo Sound, and Hallett Station, a joint United States and New Zealand operation, lie within this sector.

On March 27, 1924, *France* claimed Adélie Land on the basis of discoveries by the French explorer Dumont d'Urville in 1840. On November 30, 1925, *Argentina* made known its claims to Britain.

On August 24, 1936, *Australia* laid claim to about a third of the continent, and on January 14, 1939, *Norway* claimed the largest remaining wedge or piece of pie and named it Queen Maud Land.

On November 6, 1940, *Chile* issued a decree claiming the sector between longitudes 53° W. and 90° W.

When all these sector claims are mapped, the overlapping in Palmer Land becomes clear, as does the empty or unclaimed sector between longitude 150° W. and 90° W.

Potential or Lapsed Claims

In 1911-12 Lieutenant Choku Shirase of the Japanese navy led a sledging party some 160 miles southeast of the Bay of Whales on what he considered a trek toward the South Pole. Vague pretensions to Japanese claims resulted, although this region had previously been covered by Roald Amundsen and his men in 1910-11. Okuma Bay and Kainan Bay, on which the present Little America is located, are the sole reminders of this Japanese attempt at Antarctic exploration.

The name of New Schwabia or New Schwabenland, which appears on some maps and covers a considerable area of what is now Queen Maud Land, reflects the most dramatic of all attempts at claiming and colonizing any part of Antarctica. Adolph Hitler was determined "to secure for Germany its share in the approaching division of the Antarctic among world powers and thus to create the basis for its right to continue and develop its whaling industry." His effort was well conceived and carried out in 1938-39. The expeditionary force aboard the steel ship *Schwabenland* proceeded southward below Africa until it was stopped by the pack ice within 50 miles of the coast. A number of flights were made by seaplanes catapulted from the ship. These flights introduced photogrammetry into Antarctic exploration and resulted in the fairly reliable mapping of more than 300,000 square miles.

Spear-pointed shafts which would plunge a few inches into the ice and remain erect were dropped in great numbers from the planes. The top of the shaft carried the Nazi emblem by way of recording claims to the land.

But now let us turn to the role of the United States in Antarctica.

United States Interests

THE FIRST OFFICIAL UNITED STATES INTEREST in Antarctica resulted in a voyage by Admiral Charles Wilkes in 1839-40 which took him more than half way round the continent. Wilkes made a series of landfalls in the area below Australia of such extent that he demonstrated for the first time the reality of a continental land mass. Whether an American discovered the continent may still be debatable, but all must agree, especially in the light of modern mapping results, that Wilkes demonstrated the existence of such a land mass.

Although Antarctica was neglected by all the world for half a century after Wilkes, it was not forgotten. Indeed, the first call for an international approach to Antarctica was made by an American naval officer, Commander Matthew Fontaine Maury, who in 1861 proposed a thoroughgoing scientific exploration of the continent. His project is so eloquently and timelessly stated that it deserves to be set down in his own words:

"The Earth Was Made for Man"

"If, in pleading the cause of Antarctic exploration, I be required to answer first the question of *cui bono?* which is so apt to be put, I reply, it is enough for me, when contemplating the vast extent of that unknown region, to know that it is a part of the surface of our planet, and to remember that *the earth was made for man;*

that all knowledge is profitable; that no discoveries have conferred more honor and glory upon the age in which they were made, or been more beneficial to the world, than geographical discoveries; and that never were nations so well prepared to undertake Antarctic exploration as are those that I now solicit."

Shortly after this proposal Commander Maury resigned his commission to join the army of the Confederacy, and American interest in the ice-clad continent died down.

One of the high points in all Antarctic history was induced by the recommendations of the International Geographical Congress in Berlin in 1899, which resulted in a cluster of expeditions lasting into the second decade of the 20th century. Some of the greatest names in polar exploration belong to this period—Dr. Otto Nordenskjöld, Captain Robert Falcon Scott, Sir Ernest Henry Shackleton, Amundsen and Sir Douglas Mawson are among them.

Admiral Byrd's Expedition

In spite of the greatness of this period, no American explorer's name is in the list. It was not until Commander (later Rear Admiral) Richard E. Byrd led the first Byrd Antarctic Expedition in 1928-30 that interest in the ice-covered continent was reawakened in this country.

When Commander Byrd flew eastward from Little America over unexplored land beyond the meridian of 150° W. in 1929 and named it Marie Byrd Land, he implicitly claimed it for the United States. On December 20, 1929, my five sledging companions and I raised a flag on Supporting Party Mountain in latitude 85° 25′ S. and longitude 147° 55′ W. and recorded that we "in the name of Admiral Richard Evelyn Byrd claim this land as a part of Marie Byrd Land, a dependency or possession of the United States." We built a cairn of rocks in which we left this record in a tin can with a tightly fitting lid. So far as I know, this was the first United States claim made in Antarctica in this traditional manner.

To be sure, when these unofficial claims were aired in newspapers in New Zealand, our State Department reiterated the policy announced by Secretary of State Hughes in 1924. Even so, a number of our citizens continued to press for a change in our policy, especially after Australia laid claim to about a third of the continent in 1933 and the second Byrd Antarctic Expedition took place in 1933-35.

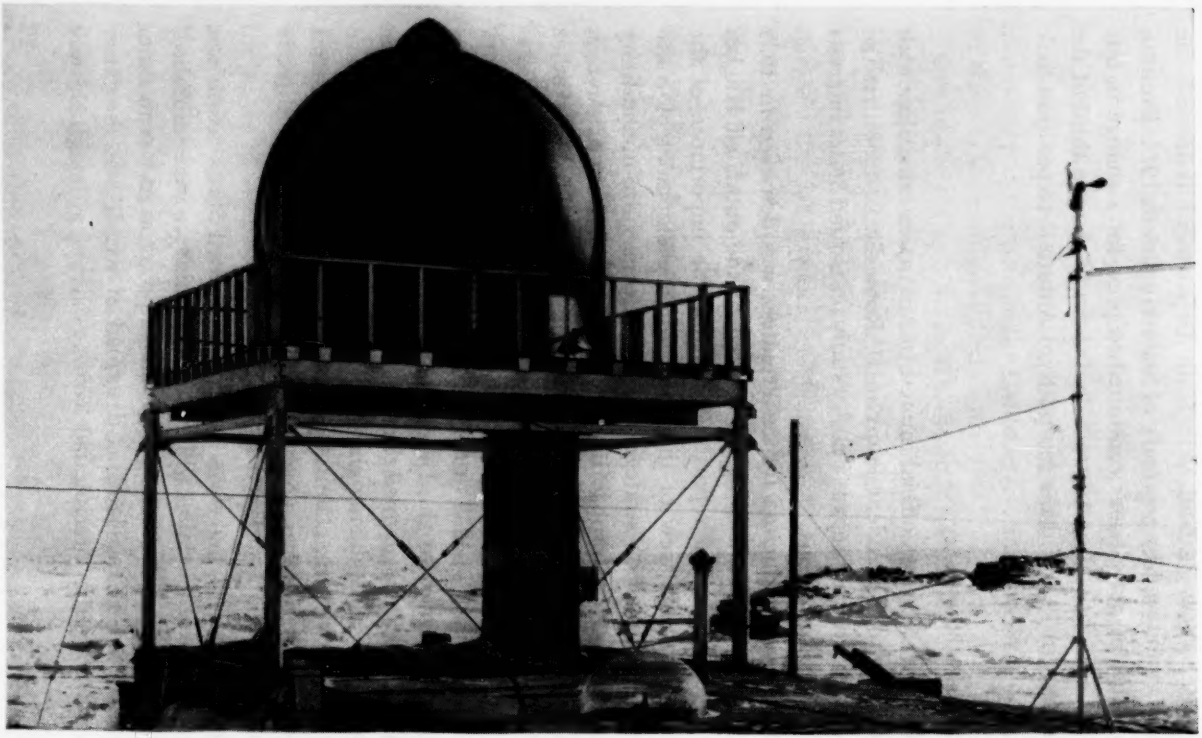
Roosevelt's New Policy

Then, at long last, official interest in Antarctica came alive with a request from President Franklin D. Roosevelt in 1938 that the State Department prepare a policy study on United States interests in both polar regions.

The report requested by the President was delivered in 1939 and recommended a complete reversal of the out-dated Hughes policy of 1924. The report pointed out the importance of the polar regions in view of the impending development of trans-arctic aviation, their strategic location of concern to our military establishment, the probability of mineral resources in Antarctica, and the active political interest in the region shown by other countries.

President Roosevelt realized the importance of prompt action, and on January 7, 1939 undertook to establish the United States Antarctic Service in the Department of the Interior. It is clear that the President planned the establishment of a number of settlements open only during the summer season which would pave the way to extensive claims. One of the areas for such a settlement was to be in what is now Queen Maud Land, almost directly south of the Cape of Good Hope.

Within a matter of days, before any United States action was taken, Norwegian claims which included this area were published, and simultaneously Hitler's steel-clad ship was on its way to claim a large part of this land as described above. It was the latter circumstance that precipitated Norway's action, although Norway



(Official United States Navy photograph)

OPERATION DEEPFREEZE. THE RAWIN TOWER AT LITTLE AMERICA

had good reasons for making such claims. In 1929 Captain Riiser-Larsen photographed from the air what is now Princess Martha Coast. Norwegian explorations were extended in this region in 1930-31 and 1935.

While the Antarctic continent is devoid of commercial assets, the seas around it have long been the world's foremost whaling grounds. The Norwegians have long dominated this lucrative industry, and the seas off the coast in question are of great importance to it, for the great factory ships not only come close to the pack ice but occasionally proceed through it toward the coast.

The Americas and Antarctica

A further proposal of this period involved a possible joint claim in behalf of all the American Republics to the Antarctic lands south of us, thus pushing the Monroe Doctrine clear to the South Pole. The urgency behind this attitude stemmed from the rising power of Hitler and the prospect of war. Our official attitude attached considerable strategic importance to this area. It was expressed in 1940 by Secretary of State Cordell Hull when he stated categorically that considerations of continental defense made it imperative that the 21 American Republics maintain a clearer title to the American quadrant or that part of the continent below the Americas than was claimed by nations outside the Americas.

The actual field operation of the United States Antarctic Service resulted in the establishment in 1940 of West Base near the site of Little America, and East Base on Stonington Island near the base of Palmer Peninsula below South America.

Explorations were to be made from these two bases over the unknown lands of West Antarctica. Much good work was done, but what the continuation of these explorations might have led to in the way of claims and "settlements" is now merely a matter of speculation, for World War II ended the United States Antarctic Service for all practical purposes.

OPERATION DEEPFREEZE. THE RAWIN TOWER AT LITTLE AMERICA (Official United States Navy photograph)

Effect of Cold War

With the end of World War II, succeeded by the cold war and the emergence of the U.S.S.R. as an opponent rather than as an ally, the strategic importance of the Arctic for modern warfare was brought into sharp focus. Recognizing the importance of training our military personnel in cold climate operations, but not wishing to make extended operations in the Arctic, the United States in 1946 carried out the largest exploratory venture in Antarctic history—Operation Highjump of the United States Navy led by Admiral Byrd. Extensive aerial photographic coverage resulted.

The confidential (recently declassified) directive for Operation Highjump reveals that one of its objectives was to extend and consolidate United States sovereignty. This venture was followed a year later by a smaller expedition, Operation Windmill, which operated under instructions similar to those of Highjump.

The continuing political interest of the United States in Antarctica is further reflected in the fact that Operation Deepfreeze I, which headed south in 1955 to begin establishing bases for the IGY, was directed to continue the political activities of Highjump and Windmill.

This objective was inconsistent with the world-wide agreement among participating nations that there should be no politics in the IGY. Accordingly, reference to political activity of any sort was dropped from the directive for Operation Deepfreeze II, carried out in 1956-57.

Strategy and Antarctica

IF THERE IS ANY PART OF ANTARCTICA that has special strategic importance from a military point of view, it is the Palmer Peninsula region.

Drake Passage between Cape Horn and Palmer Peninsula is more than 700 miles wide and is the only natural link between the Atlantic and Pacific oceans. Believing in the great importance of this broad waterway, Britain directed Captain Bransfield in 1820 to investigate the lands south of Drake Passage with a view to their colonization. He was especially instructed to establish friendly relations with the natives. Belief in the strategic importance of Palmer Land also led to Secretary of State Hull's proposal referred to above.

Except for Drake Passage, Antarctica is surrounded by oceanic waters of such breadth that they do not carry specific names. Indeed, the Atlantic, the Pacific and the Indian oceans merge in one great belt of such proportions that it has at times been loosely referred to as the "Antarctic Ocean."

Is Antarctica Militarily Significant?

Although it is some 2,000 miles from Antarctica to lands that lie to the north, except for South America, there may be strategic advantage in possession of parts of the continent below New Zealand, Australia and Africa.

Military establishments of great powers with vast resources be-

yond any possessed by the nations mentioned as claimants could conceivably command these waterways with modern aircraft. However, the cost of building and maintaining such establishments, even for the richest nations, would amount to sums of astronomical proportions. While the development of intercontinental guided missiles may cause the above observations to be outmoded, it would be premature to make such dogmatic assumptions at the present time.

Even now an unfriendly power with long-range submarine fleets might find sub-Antarctic waters the safest place from which to operate. It will be recalled that German raiders operated from these waters with devastating effectiveness during World War II. Several hundred thousand tons of shipping were sunk or captured. The *City of Bayville,* the first United States vessel to be sunk in the war, was a victim of German mines laid in Australian waters.

It is a natural concern of those countries nearest Antarctica to discourage actually or potentially unfriendly powers from securing a foothold on the continent. Australia has been worried over the presence of Russian bases in the sector it claims. This apprehension has on occasion erupted into vigorous editorial protests in Australian newspapers.

Air Routes: Arctic and Antarctic

The Arctic and Antarctic regions are better understood in terms of their contrasts rather than their similarities. This is especially true when we consider air travel. A misleading assumption all too frequently made is that because transarctic air routes are important it naturally follows that transantarctic routes have a similarly great future. This is not the case.

By sheer logic of geographic position the Arctic is destined to become one of the main, if not the main, crossroads for air traffic on a global scale. Most of the world's land mass lies in the Northern Hemisphere. Most of the earth's most highly developed

and, except for India and China, most populous lands lie about the Arctic. Ninety percent of all the people of the world live north of the equator, and ten of the world's largest cities lie between the Arctic Circle and the Tropic of Cancer; only nine of the world's cities with populations over a million lie outside this zone.

The world's traffic has, therefore, been largely between points in the Northern Hemisphere and it will continue to be so. If there is peace in the future and easy access to the air over the U.S.S.R. and other countries of Eurasia, the ancient dreams of both northeast and northwest passages will be fulfilled by man's modern ships of the air. The geographical concepts of Henry Hudson and others of his age were correct. Only their methods—ships of the sea—were inadequate.

Antarctica does not now nor can it ever have a comparable position of importance in world affairs, yet it is destined to play an increasingly important role.

With the filling up of the vast empty areas of parts of Africa, Australia and Brazil the disparity in population between the Northern and Southern hemispheres may decrease. And in any event the population of the Southern Hemisphere is bound to increase in the predictable future. Transantarctic flights from Sydney to Buenos Aires or from Christchurch, New Zealand, to Chile or Rio will sooner or later become routine and will save many thousands of miles over present air travel patterns between these areas.

Serious Problems

Certainly the real or assumed strategic importance of Antarctica is one of the compelling reasons for the active interest of many nations in Antarctic claims. There are other supplementary but important ones, such as the probability of the existence of rich mineral resources. As pointed out earlier, on the basis of our present knowledge we do not know whether there are any mineral

deposits of potential commercial value or not. Only on the basis of the laws of probability or chance have we any right to assume that such deposits do exist. The expectation of such long chances seems to be one of the major reasons for the great interest of several nations in the ownership of this great bleak continent.

But even if actual discoveries were made, the exploitation of mineral resources in this inhospitable region would raise serious problems, indeed—far more serious than would be met in the exploitation of mineral resources in the Arctic.

There is, of course, the added competitive element. No nation wants to be left out, whether Antarctic claims ever amount to anything or not. For such countries as Argentina and Chile the possession of Antarctic claims means a place in the sun among the greater world powers. The existence of such claims has frequently been the excuse for whipping up more intense feeling at home, perhaps for diverting attention from internal problems. Neither Chile nor Argentina has been willing to accept arbitration of its claims as opposed to those of Britain by any agency, international or other.

The IGY in Antarctica

NEW INTEREST HAS BEEN AROUSED in Antarctica—this time for scientific rather than strategic or political reasons—by the activities of the International Geophysical Year, which began July 1, 1957 and will end December 31, 1958. The IGY is man's greatest experiment in international cooperation. Some 66 nations are participating in this world-wide study of man's total environment.

The scientific program includes (1) the study of the shape and structure of the earth and more precise measurements of longitude and latitude; (2) a study of the earth's heat and water budget, which will involve meteorology, oceanography and glaciology; and (3) the physics and chemistry of the upper air, even to outer space.

Man's Increased Mobility

The International Geophysical Year is an inevitable result of the pressure from man's increased mobility. As he discovers new sources of energy, new kinds of power which enable him to travel faster, to fly higher, man must have more precise knowledge of all aspects of his physical environment.

Every one of the geophysical sciences is global in character. None can be fully explored and understood except on that basis. The geophysicist cannot be provincial.

It was a foregone conclusion that in such a universal program Antarctica would claim major attention. It is earth's last great

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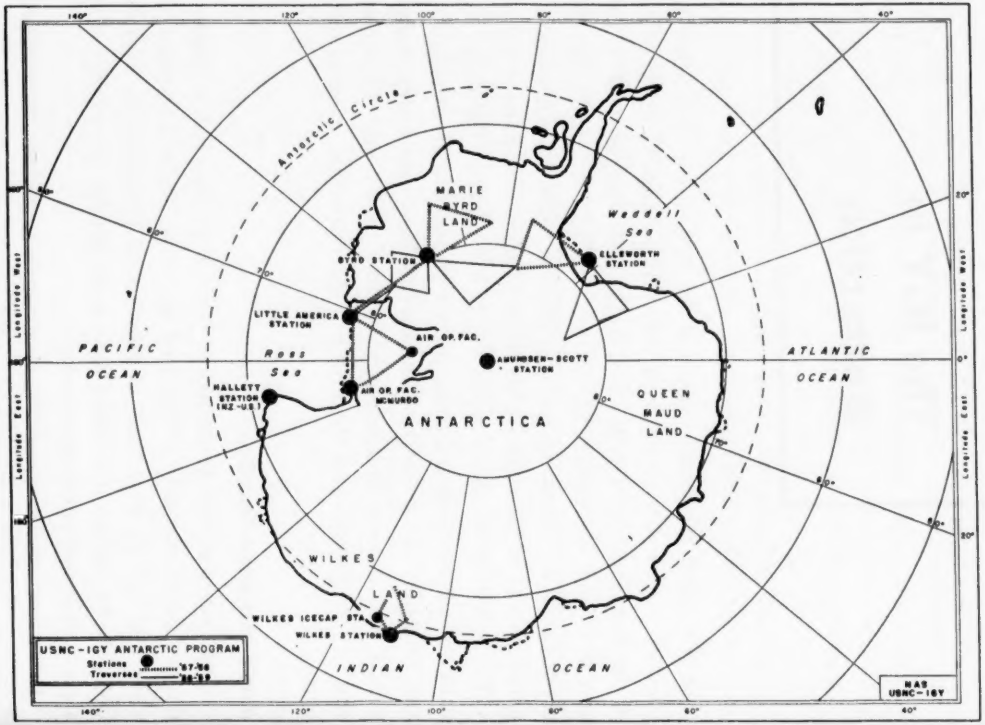
International Geophysical Year—U. S. ANTARCTIC STATIONS



empty sector; and no field of geophysics can be complete without specific data that can come only from this vast continent and its surrounding oceans.

IGY stations blanket the world, but most of them are at long-established bases or at new ones in easily accessible regions. Antarctica presents special logistic problems, with the result that today the continent is under "attack" by expeditions from 11 countries which have established 48 scientific bases on the mainland or on islands near it.

New U.S. Operations

The United States effort for IGY is supported nationally in three ways. The National Academy of Sciences is responsible for planning and executing the scientific program. The National Science Foundation as fiscal agent has accepted responsibility for securing federal appropriations to finance the program. The Department of Defense is supplying all logistic support for Antarctic operations and the launching mechanisms for rockets and the earth satellite vehicles.

The United States Navy was given responsibility for implementing the United States IGY logistic requirements in Antarctica. To accomplish this it organized a staff known as Task Force 43 under the command of the veteran Antarctic explorer Captain (later Rear Admiral) George J. Dufek. The first act of the new task force was to send the icebreaker *Atka* on a reconnaissance voyage to Antarctica during the Antarctic summer of 1954-55.

Building of New Bases

Its primary mission was to investigate the Antarctic coast for possible station sites to be established later. A major result was the discovery that the Bay of Whales, on which Amundsen had established his base in 1910 and on which a succession of four Little Americas had been built, had largely disappeared and that some new location had to be found for the proposed Little

(Walter Sullivan for *The New York Times*)

This D-8 tractor, with its tracks especially widened for use in the Antarctic snows, weighs 37 tons. In case it suddenly breaks through (as happened last year, killing the driver), it is driven by reins. Four such trips are required over newly laid trail in the crevasse fields before anyone is allowed to ride one of these D-8's across the surface.

America V. Kainan Bay, 30 miles east of the Bay of Whales, was selected.

In 1955-56 Operation Deepfreeze I continued the activity with the successful establishment of the main IGY base at Little America and the building of the naval facility at McMurdo Sound. The latter is the base from which logistic operations are directed and possesses the only runway on which airplanes with wheels can land.

In 1956-57 Operation Deepfreeze II succeeded in completing the five additional IGY bases—Ellsworth, Wilkes, Hallett (the one station jointly operated with New Zealand), Byrd and the Amundsen-Scott South Pole. It also delivered all IGY personnel to their respective bases, so that scientific observations were all organized and under way before the actual beginning of the IGY on July 1, 1957.

The establishment of the Byrd and Amundsen-Scott bases deserves special mention. These are the first bases ever established inland in Antarctica. At the South Pole, except for personnel and a limited amount of equipment which were landed by light ski-equipped planes, all other materials were air-dropped by planes from McMurdo Sound. More than 65 missions were completed by the great Air Force Globemasters (C-124s). Some 800 tons of material, including a 14,000-pound tractor, were delivered to the South Pole base.

The establishment of Byrd Station was equally impressive in a different way. Here the mission was carried out by great tractor-train operations. This involved the establishment of a well-marked 647-mile route which necessarily crossed a dangerously crevassed area more than seven miles in width. It took five weeks for the special Army Transportation Corps team with Navy personnel to "bridge" this crevassed zone.

The successful establishment of the Byrd and Amundsen-Scott stations by Operation Deepfreeze II under Admiral Dufek's command takes its place among the great logistic achievements in the long history of polar exploration.

Stations of Other Nations

U.S.S.R. The central Soviet station of Mirny was established in January 1956, at 66° 33′ S., 93° 00′ E. Some 83 men have wintered at this well-equipped and well-manned station. Oasis, a small subbase was established in the Bunger Hills, midway between Mirny and our Wilkes Station. On December 16, 1957 a major base, Vostok, was established at the South Geomagnetic Pole. The Soviets plan to establish a third major base, Sovietskaya, at the geographic center of the continent during 1958. This base will be at the so-called "pole of inaccessibility" which lies more than 400 miles from the geographic pole on longitude 90° E.

Britain. At present Britain has a total of 16 stations. Eleven of these lie within the Falkland Islands Dependencies on or near Palmer Peninsula. They were established before the IGY, but have been enlarged to include its program. The main IGY base was established by The Royal Society near the head of the Weddell Sea.

Argentina. Argentina is operating ten stations, six of which are on the Palmer Peninsula. General Belgrano Base at the head of the Weddell Sea was established in 1955.

Australia. Australia had established Mawson Station at 60° 36′ S., 62° 54′ E. in 1954 and enlarged it in 1955-56 to include the IGY program. Early in 1957 Davis Base, an auxiliary station, was established some 300 miles west of Mawson.

Belgium. Belgium has established a station at Breid Bay, 70° 30′ S., 23° 00′ E., where 17 scientific and technical personnel plan to carry out IGY programs during the coming Antarctic winter.

Chile. Chile has long had six meteorological stations in the Palmer Peninsula area. All six of these stations and three sub-Antarctic stations are carrying out IGY programs.

France. The main French station, *Dumont d'Urville,* is located on the coast of Adélie Land. *Charcot,* a small auxiliary station, has been established 300 miles inland.

Japan. In January 1957 the Japanese Research Expedition established Showa Station at 69° 02′ S., 39° 36′ E. Eleven wintered here during 1957.

New Zealand. In addition to Hallett Station noted above, New Zealand established Scott Station on Pram Point about two miles from the United States naval facility on McMurdo Sound. Sixteen men wintered here in 1957.

Norway. In January 1957 Norway established its IGY station at 70° 30′ S., 02° 32′ W. Fourteen men have carried out IGY activities here with a small meteorological station 40 miles away on the coast to assist.

Union of South Africa. The Union of South Africa reactivated its station on Marion Island in 1955-56 for occupation during the succeeding year by an IGY staff.

Antarctica After IGY

What will happen after the International Geophysical Year? To a scientist it is inconceivable that our vast national effort in Antarctica should come to a complete stop on December 31, 1958, and that we should desert all our bases and go home. It is most unlikely that this will happen. The IGY as such automatically ends on the stated date, but it seems certain that many major scientific programs will continue, and it must be hoped that most of the nations which now have well-established stations will maintain them indefinitely.

The value of scientific data being gathered by IGY is cumulative. The longer continuous observations can be maintained, the greater is the value to any part as well as to the whole.

It has been wisely said that the major exports from Antarctica for a long time to come will be scientific data. It might also be said that some of these data may turn out in the long run to be of more value to mankind than all the mineral riches the continent may hold.

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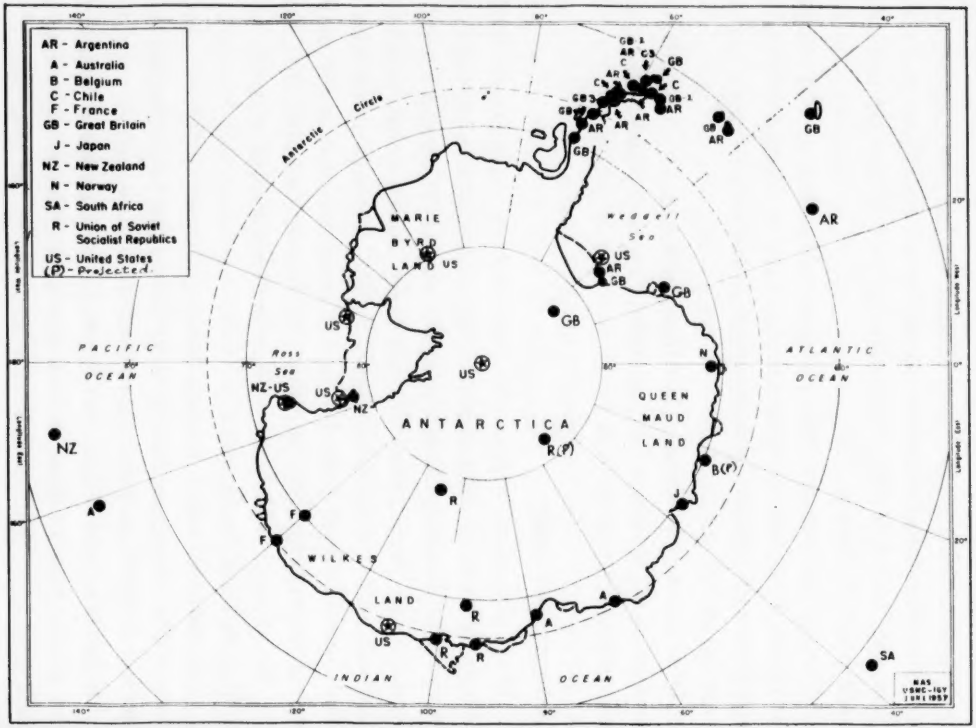
International Geophysical Year—PLANNED ANTARCTIC STATIONS



Meteorology Touches All Mankind

Of all the aspects of man's environment that affect his way of life in such diverse areas as transportation, communication and agriculture, the atmosphere comes first. Meteorology, the study of the earth's weather, touches every man everywhere. The atmosphere which blankets our earth and at once provides us life-giving oxygen and water and also protects us from the lethal rays of the sun is a closed system. The air over Antarctica today may be over Argentina tomorrow. Surprisingly little is known about the exchange of great air masses between the polar regions and the tropics.

That the vast Antarctic icecap, which is large enough to cover the United States and Mexico combined, has a profound effect on weather and climate has long been suspected. Certainly, the hub of the atmospheric circulation for the Southern Hemisphere is located on Antarctica, and just as certainly it is the world's greatest cold weather factory.

For the first time we shall have coordinated observations from many stations which may provide a major breakthrough in estimating the role Antarctica plays in the world-wide picture of weather and climate. I predict that the role will prove so important that it will dramatize the urgency of maintaining Antarctic weather stations to provide a continuing flow of data which are necessary for the construction of world-wide weather maps. With man's accelerated speed and increasing global flights such maps are becoming more and more important.

Need for Antarctic Studies

Antarctica has another indirect but profound effect on world weather and climate. It has been estimated that Antarctica discharges into the seas that surround it ice in such quantity that, combined with the sea ice which annually forms a "halo" several hundred miles wide around the continent, it would cover all the land masses of the earth with a layer one foot thick.

This ice melts, sinks below the surface, and moves northward to be compensated for by a poleward movement at the surface. Next to nothing is known about these major currents and the time element involved. Some geophysicists believe that a study of such ocean currents will reveal them as important factors in weather and climate.

Man's long-continued life on this planet earth depends on an ever better knowledge of his environment. To the casual observer the vast Antarctic icecap may appear to be of technical scientific interest only. This is not true. Since nearly 90 percent of all the land ice in the world lies on Antarctica, changes in the volume and thickness of the ice are matters of universal concern. The return to the oceans of but a few feet of thickness of ice as melted water would have serious effects in many places; and if all the ice melted into the sea, its level would rise 150 to 200 feet. All the world's densely populated coastal lowlands and all of its seaports would then be submerged. Such great changes in the volume of Antarctic ice have occurred in the past and may recur. That they may not occur with catastrophic suddenness does not mean that they are not of practical concern to man if he expects his progeny to inhabit the earth for thousands of years to come.

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After 1958, What?

The International Council of Scientific Unions (ICSU), which promoted the International Geophysical Year through a specially created committee, Comité Spécial de l'Année Géophysique Internationale (CSAGI), is deeply interested in the continuity of scientific programs after the IGY terminates on December 31, 1958. Toward that end it appointed an *ad hoc* committee to consider post-IGY activities in Antarctica. This committee met in Stockholm on September 9-11, 1957 with representatives from the following countries: Argentina, Chile, France, Britain, Norway, Japan, the U.S.S.R. and the United States. The announcement by the Soviet delegate that the U.S.S.R. intended to continue

its programs after IGY removed whatever doubts other delegates may have had about the desirability of doing so.

In view of the recommendations of this *ad hoc* committee, ICSU has now set up a permanent committee, the Special Committee on Antarctic Research (SCAR), with representatives from the countries participating in Antarctic IGY programs. The initial meeting of this committee was held at The Hague, February 3-6, 1958.

It is unlikely that the continuing scientific programs will provide as broad a coverage from as many stations as the IGY activities have covered. What is hoped and expected is that there will be no curtailment of essential features, although there may be a reduction in the number of stations.

The successful operation of Hallett Station jointly by New Zealand and the United States may have established a precedent that will be followed elsewhere. For instance, there seems no good reason why one station at the head of Weddell Sea jointly operated by Argentina, Britain and the United States could not provide the essential coverage for this region.

Real economies could also be effected by the consolidation of stations in the Palmer Peninsula region. Political considerations, however, make this less likely to occur.

Political Considerations

For whether by chance or not, Palmer Peninsula, the most attractive part of Antarctica, is claimed by Britain, Argentina, and Chile. This area holds greater possibilities for the existence of metallic mineral deposits than any other part of the continent. To aid Argentina, the United States could revive Secretary of State Hull's proposal for invoking the Monroe Doctrine to include all lands to the South Pole. Such a proposal, however, would certainly not be acceptable to the British.

Shall the United States make official claims to the unclaimed section between longitudes 90° W. and 150° W? Chilean claims extend to the 90th meridian, whereas the British end at the 80th.

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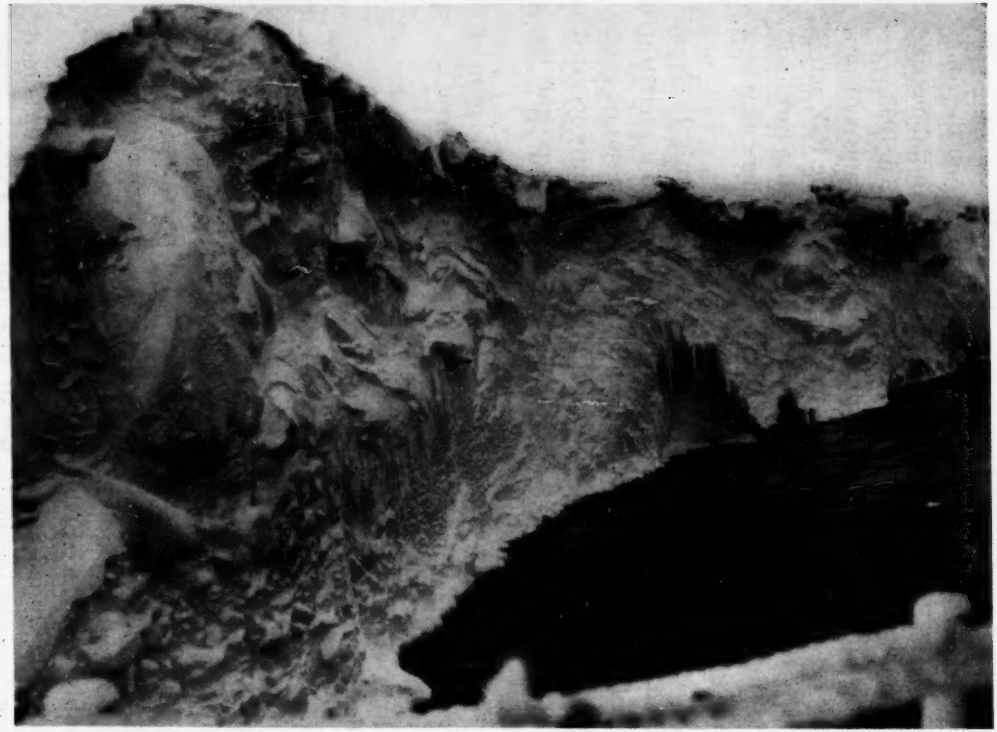

(Official United States Navy photograph)

BARRIER ICE AT GENERAL ERSKINE BAY, PRINCESS ASTRID COAST.

If we limit our claims short of the 90th meridian, this might be interpreted by the British as an endorsement of the Chilean position. But if we extend our claims to the 80th meridian, this would be viewed by Chile as sheer trespass and would undoubtedly bring forth a vigorous protest.

Probably all the claimant nations in Antarctica tacitly accept the United States' right to claim Marie Byrd and Ellsworth lands between longitudes 90° W. and 150° W. This area, however, is still the most inaccessible part of Antarctica. Repeated attempts have been made to penetrate the dense pack ice that hugs the coast of Marie Byrd Land. Only one ship was partially successful, and that was probably due to the fact that it was a freak summer.

BARRIER ICE AT GENERAL ERSKINE BAY, PRINCESS ASTRID COAST. (Official United States Navy photograph)

Our only access now to Marie Byrd Land is over the Ross Dependency claimed by New Zealand. Moreover, the only known land area that could be used as a base for an airstrip is near our naval facility at McMurdo Sound, which is also in the Ross Dependency. A joint claim by the United States and New Zealand would have merit and might be advantageous to both. Antarctic exploration is costly. New Zealand, with a population about equal to that of the state of Minnesota, does not have the resources to build and maintain far-flung Antarctic bases. Probably New Zealand is now making a greater per capita investment in Antarctic research than any other nation.

A further suggestion is that Australia join New Zealand and the United States in a common claim that would include almost two-thirds of the continent.

Although the U.S.S.R. has made no claims in Antarctica, it has long since made it clear that it will recognize no realignment of claims to which it is not a party. It is not likely that any of the approaches suggested above would win the acquiescence of the Russians. On the contrary, these moves might stimulate them to make claims of their own on the basis of von Bellingshausen's supposed discoveries.

Hindsight is inevitably clearer than any other kind of sight. On the basis of the discoveries of the early American sealers,

Palmer and Burdick, and more particularly of what has but recently been recognized as the brilliant achievements of Wilkes in 1839-40, the United States at the time of Secretary of State Hughes' historic policy statement in 1924 could probably have claimed without much, if any, protest, more than half the continent.

On February 15 the House Committee on Interstate and Foreign Commerce recommended that the United States not only continue scientific activities in Antarctica after the end of the IGY, but also prepare to lay claims to that icy continent in order to prevent the U.S.S.R. from obtaining exclusive footholds in the region. For this purpose the committee recommended that the United States re-evaluate the 1924 Hughes policy, under which this country neither claims territory in Antarctica nor recognized the claims of other nations. The Navy favors territorial claims by the United States, but the State Department, under the Hughes policy, has hitherto opposed them.

Should Antarctica Be Internationalized?

Whatever may be the eventual resolution of Antarctic claims, under present conditions it would be the greatest misfortune in our relations with the free world, particularly the English-speaking peoples, to abandon our IGY bases and our naval base at McMurdo Sound. If we did this we would sustain a loss in prestige comparable to that which followed the launching of Sputnik I.

Prime Minister Jawaharlal Nehru of India recently proposed that the whole matter of Antarctic claims be discussed by the United Nations General Assembly, but his proposal did not get on the agenda. Yet it is difficult to see how face-saving, so important among the nations with overlapping claims, can be accomplished except by some form of internationalization of Antarctica.

Perhaps the experience of the International Geophysical Year will provide a point of departure toward an international solution. The IGY may turn out to be a brilliant new approach toward

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world organization. The geophysicist is inevitably a truly international scientist. During current Antarctic operations all considerations other than scientific have been set aside. Cooperation among all participating nations is real. For instance, the United States has an American meteorologist at the main Russian base of Mirny. Conversely, Russia has a first-rate meteorologist helping in our program at Little America. The exchange of information between these bases and among all the rest has been as free and unhampered as radio communications could make it.

The location of the various bases was agreed upon at an international conference in Paris in July 1955, without any mention whatever being made of present or possible political claims. The chief criterion was the provision for the best scientific coverage. Thus, our own American stations are located in areas currently claimed by Britain, Australia, New Zealand, Argentina, and the still unclaimed sector between 90° and 150° West longitude. Our South Pole Station, of course, occupies territory at a point common to all claimants. The British, French, Argentine, Chilean and Norwegian bases are in lands claimed by the respective nations, but the Russian bases are located within the sector claimed by Australia.

Precedents are important in the evolution of civilization, and it is the hope of IGY scientists that the intergovernmental cooperation in IGY will carry over into other areas and will lead nations to work together in other fields of human activity.

Talking It Over

IN THIS DISCUSSION GUIDE YOU WILL FIND discussion topics and reading references arranged for a series of six meetings, together with a list of recommended visual aids. These are suggestions only—a starting point to help you plan a study-group program or a classroom teaching unit.

For further suggestions or for assistance in organizing a discussion series or study project, write to Foreign Policy Association, 345 East 46th Street, New York 17, New York.

Discussion Questions

1. Character of the Continent

What are the chief differences between the Arctic and the Antarctic?

What are the special characteristics of the Antarctic climate which make the continent so inhospitable?

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Why is Antarctica the world's greatest desert?

Is there any basis for assuming the existence of great mineral deposits in Antarctica?

Why has Antarctica remained so little known?

READING REFERENCES

Amundsen, Roald, *The South Pole*. London, John Murray, 1912.

Cherry-Garrard, Apsley, *The Worst Journey in the World*. New York, The Dial Press, 1930.

Gould, Laurence M., *Cold: The Record of an Antarctic Sledge Journey*. New York, Harcourt, 1931.

Mawson, Sir Douglas, *The Home of the Blizzard*. London, Heinemann, 1915.

Mill, Hugh Robert, *The Siege of the South Pole*. London, Alston Rivera, 1905.

Nordenskjöld, Otto, "The Geography in the Polar Regions." *American Geographical Society Special Publication*, No. 8. New York, American Geographical Society, 1928.

Ronne, Finn, *Antarctic Conquest*. New York, Putnam, 1949.

Scott, Robert F., *Scott's Last Expedition*, Vols. I and II. New York, Dodd, 1913.

Shackleton, Ernest H., *The Heart of the Antarctic*. Philadelphia, Lippincott, 1909.

Shackleton, Sir Ernest H., *South: The Story of Shackleton's Last Expedition, 1914-17*. New York, Macmillan, 1920.

Sullivan, Walter, *Quest for a Continent*. New York, McGraw, 1957.

2. Political Claims

What is the pattern by which the various political claims are delimited in Antarctica? How has this pattern or principle evolved?

What was the principal basis for most Antarctic claims? What is the weakness of Antarctic claims as reflected in the opinion of Secretary of State Hughes in 1924?

What specific tests do Chile and Argentina insist on as validating Antarctic claims?

What economic factor attaches particular importance to Norwegian claims?

In what way is the American Antarctic region more complicated than any other?

READING REFERENCES

Heron, David Winston, "Antarctic Claims." *Foreign Affairs*, Vol. 32, July 1954, pp. 661-667.

Orlov, B., "Russian Antarctic Discoveries of 1821 Are Basis of Soviet Claim." *U.S.S.R. Information Bulletin*, Vol. 9. No. 9, May 13, 1949, pp. 296-297.

Sullivan, Walter, "Antarctica in a Two-Power World." *Foreign Affairs*, Vol. 36, October 1957, pp. 154-166.

3. United States Interests

Who first demonstrated the reality of an Antarctic land mass?

Are there any reasons for the lapse of United States interests in Antarctica from 1840 until the first Byrd Antarctic Expedition in 1928?

What factors led President Roosevelt in 1938 to repudiate the Hughes doctrine?

How did President Roosevelt plan to implement his new doctrine?

What caused a revived interest in Antarctica by our military shortly after World War II?

READING REFERENCES

Byrd, Richard E., *Discovery*. New York, Putnam, 1935.
———— *Little America*. New York, Putnam, 1930.
Dufek, Rear Admiral George J., *Operation Deepfreeze*. New York, Harcourt, 1957.
Ellsworth, Lincoln, "My Four Antarctic Expeditions." *The National Geographic Magazine*, Vol. 76, July 1939, pp. 129-138.
Simpson, F. A., ed., *The Antarctic Today*. Wellington, Reed for the New Zealand Antarctic Society, 1952.

4. Strategy and Antarctica

What part of Antarctica is of special strategic importance to the Western Hemisphere? What proposal did Secretary of State Hull make in this connection?

In what ways might other parts of Antarctica be of strategic value for other Southern Hemisphere lands?

What reasons have we for believing *transantarctic* air routes will one day be established?

Will such routes ever be as important as *transarctic* air routes? On what facts do you base your answer?

Why should there be such deep current interest in political claims in Antarctica?

READING REFERENCE

Sullivan, Walter, *Quest for a Continent*. Cited.

5. The IGY in Antarctica

Why is geophysical research of such major importance in Antarctica?

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How is the IGY program being implemented in Antarctica?

What United States bases presented unprecedented logistic problems?

What is the basis for the statement that Antarctica is "the world's greatest cold weather factory"?

Why is the thickness of the Antarctic icecap of concern to all the world?

In what way does the IGY suggest a resolution to conflicting political claims in Antarctica?

READING REFERENCE

"Antarctica in the International Geophysical Year." *American Geophysical Union Publication* No. 462. Washington, D.C., American Geophysical Union, 1956.

6. How About the Future?

Do you think the United States should now make claims in Antarctica? Why? Why not?

Is there any conflict between the State Department and other agencies about the advisability of making claims?

READING REFERENCES

Antarctica, a Selected Bibliography. New York, United Nations Library, 1956.

Gould, Laurence M., "Antarctic Prospect." *The Geographical Review,* Vol. 57, No. 1, January, 1957, pp. 1-28.

The Polar Record. Cambridge, England, Scott Polar Research Institute, Vols. 1-7, 1931-55.

Sailing Directions for Antarctica. Washington, United States Hydrographic Office, H.O. 138, 1943 (corrected to July 1955).

Accounts of Antarctic expeditions have appeared regularly over the years in *The Geographical Review, The National Geographic Magazine,* and *The Geographical Journal.*

Visual Aids*

Adélie Penguins of the Antarctic. Produced by the New York Zoological Society. 20 min., color. Rental $5.00 from the New York Zoological Society, Department of Education, 185th St. & Southern Blvd., New York 60, N.Y. Records the life cycle of the Adélie penguins.

* Unless otherwise noted, all films are 16 mm, sound, and in black and white. For information on rental of films, write to Audio-Visual Department, World Affairs Center for the U.S., UN Plaza at 47th Street, New York 17, N.Y.

Antarctic Expedition. Produced in 1947. 18 min. Free loan from nearest Naval District (apply to Assistant for Public Information). The Navy expedition to Antarctica in 1946-7 known as "Operation Highjump." Shows the mapping of vast areas, discovery of new peaks and mountains and the testing of cold-weather equipment.

Antarctic Vigil. Produced in 1953. 10 min., color. Rental $2.50 from Australian News & Information Bureau, 636 Fifth Ave., New York 20, N.Y. Shows the research stations, maintained principally for weather observation, of the Australian research expedition on Macquarie and Heard Islands in the Antarctic Ocean.

Expedition to Antarctica. Produced in 1948 (an excerpt from the film "Secret Island" produced by MGM). 20 min. Apply to local film libraries. Based on Admiral Byrd's expeditions to Little America. Presents highlights of the preparations, activities and achievements of the polar expeditions.

The Restless Sphere. Produced in 1957 by the British Broadcasting Corporation. 80 min. Narrated by Prince Philip, Duke of Edinburgh. For rental apply to Screencraft Pictures, Inc., 15 West 44th Street, New York 36, N.Y. A complete report on the International Geophysical Year. Filmed in 17 countries, covering the various projects that have been set in motion by the world's scientists, the film is divided into three parts, covering the earth's interior, its surface and its outer atmosphere.

White Continent. Produced in 1952 by the British Information Services. 20 min., color. Rental $6.00 from Contemporary Films Inc., 13 East 37th St., New York, N.Y. The detailed planning of a joint expedition to Queen Maud Land in the Antarctic. This is an account of the first stage of the expeditions' journey from its departure from Europe towards the end of 1949 to the establishment of the base camp and the departure of the ship's party, leaving the wintering party behind.

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